National Cooperative Soil Survey

May 1999
Issue 7

NCSS Newsletter

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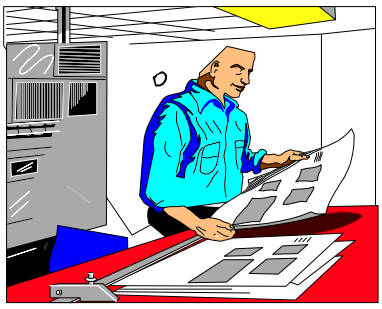
Editor's Note

Issues of this newsletter are available on the World Wide Web (www.statlab.iastate.edu/soils/soildiv). Click on NCSS and then on the desired issue number of the NCSS Newsletter.

You are invited to submit stories for future issues of this newsletter to Stanley Anderson, National Soil Survey Center, Lincoln, Nebraska. Phone—402-437-5357; FAX—402-437-5336; email—sanderson@nssc.nrcs.usda.gov.



Soil Survey in the United States, and led a round of applause for all of the men and women involved in the soil survey program over the years.

The Soil Exhibits were a tremendous hit with Secretary of Agriculture Glickman and Deputy Secretary Rominger, who spent 30 to 40 minutes in the Soils Tent with their entourage of press and photographers.

Thanks to all of those who did such an excellent job of preparing and shipping the monoliths, which made an impressive display—all 53 lined up in a semicircle. They attracted visitors like a magnet.

Also, a very special thank-you to those who assisted with the Soil Survey Centennial venue. We could not have pulled this off without their help.

The Earth Day Volunteers helped with the displays and exhibits for the Soils Tent and were available to greet the public and answer questions. Several people were responsible for specific displays, exhibits, or demos.

The Volunteers were mostly field soil scientists from 24 states. They are involved with Project Soil Surveys or Technical Soil Services. Many were actively involved in collecting their State Monoliths. The Earth Day Volunteers also included three Earth Team Members, a Soil Conservationist, and a Geographer, as well as Soil Scientists from NHQ and the National Soil Survey Center.

In addition to the displays and activities in the Soils Tent, there were two activities outside the tent. Ed Workman and Dwayne Williams from Illinois featured their soil probe truck, and Jim Doolittle demonstrated his ground penetrating radar unit.

Again, thanks to everyone who had a hand in making the 1999 Earth Day and Soil Survey Centennial event happen. We can all take great pride in our National Soil Survey Program. ■

Two of the soil monoliths exhibited on Earth Day.

A Short History of Soil Interpretations

By Joe D. Nichols, Soil Scientist (retired), United States Department of Agriculture, Natural Resources Conservation Service.

Early Soil Interpretations

Soil interpretations have been an important part of soil surveys in the United States since the beginning of the soil survey program. The early soil surveys were designed for agricultural use and prediction. Several of the first soil surveys, including the first soil survey in Texas, were made, we understand, because of the desire to grow tobacco or improve tobacco production.

For the first 5 years, each soil survey stood alone with no correlation of the soils across survey area lines. When soil correlation or inspection procedures were established by 1906, not much was said about correlation of interpretations.

The early soil surveys included varying amounts of interpretations but generally at a minimum indicated the kinds of crops grown, the amount of soil in cultivation, relative yields, and perhaps something about fertilizers and organic matter. The need for drainage was sometimes mentioned. Erosion by wind and water was mentioned, but the degree was not mapped, nor was information on erosion-control measures offered. Some increase in the amount of interpretations occurred when Agricultural Experiment Stations began to cooperate in the soil survey program. Dr. Charles E. Kellogg mentioned in his 1961 pamphlet "Soil Interpretation in the Soil Survey" that "Less thought and attention were given to soil survey interpretation during the first 30 years of the work."

Expansion of Soil Interpretations

By 1931, Dr. H.J. Harper of the Oklahoma Agricultural Experiment Station was writing a section in soil survey manuscripts on soil management. Assistance in other states was common. Some soils laboratory data was being included in the documents. In the middle 1930's, the Soil Erosion Service, later called the Soil Conservation Service (SCS), began experiments on soil erosion and some Agricultural Experiment Stations did similar work. Information on crop rotations and erosion-control methods was included in many manuscripts. The development of the Land Capability Class system by the Soil Conservation Service included assistance on alternative conservation treatments. By the late 1930's, pictures of soils and their management and generalized soil maps were being used. By 1935, the survey of Clay County, North Carolina, had three eroded phases, although many counties had no eroded phases until the 1940's. The first complex map unit I know about was in Nebraska in 1934. Complex units were described in the 1937 "Soil Survey Manual," USDA Miscellaneous Publication No. 274. Complexes did not catch on fast; some surveys were without them well into the 1940's. The 1938 USDA "Yearbook of Agriculture, Soils," was a widely used source of information on soil interpretation.

Soil Interpretations in the 1950's

A period of rapid increase in the amounts of soil interpretation began about 1952, when the Bureau of Chemistry and Soils and the Soil Survey of the Soil Conservation Service were combined. Also, at about this time, there was a change to the large format soil survey publication with larger scale soil maps. The 1951 "Soil Survey Manual" was a good tool for making and interpreting soil surveys. In 1953, Dr. Kellogg created the job of Soil Correlator for Interpretation in each Principal Correlators Office.

Soon after, a position to assist with soil survey reports and a course to teach this subject were added. The number of soil scientists increased greatly with what was known as the Standard Soil Survey. I began work in Harper County, Oklahoma, early in 1956. We were mostly reworking a good-quality old survey to modern standards. We had eroded phases, and we had complexes. The soil survey for that county, Series 1956, issued in 1960, was on the large format, 9 by 11 inches. There was some interpretative soils information in the description of the map units and more in the soil grouping by Soil Capability Units. Range site interpretations were given by range site groupings. We sampled 10 soils for the National Bureau of Public Roads project. There was a section in the report, with tables, on engineering properties of soils, written by an Oklahoma State Highway Department research engineer. A Soils in Conservation Engineering section was written by an SCS engineer.

What Were We Interpreting?

The early soil surveys were interpreted by map units. The 1937 "Soil Survey Manual" stated that not all classification units were map units and went on to explain complexes and miscellaneous land types. The

Interpretation continued on page 4

1951 “Soil Survey Manual,” page 365, states that the agricultural capabilities of each map unit need to be predicted. It was obvious that range sites were by map units and not by soil series phases. The Land Capability Classes were by map units, as were the main guides for conservation planning.

Advances in Interpreting Soils

Data for each survey area was supposedly gathered for that survey. Data from nearby surveys was used when possible. The Land Capability Units were coordinated by Major Land Resource Areas (MLRA’s). Land resource areas continued to be important for other USDA agencies as well as for SCS. In 1963, SCS Washington Advisory 223 (as I remember) ordered that SCS personnel coordinate soil interpretations by Major Land Resource Areas. We met several times with soil scientists, plant scientists, conservationists, and engineers from adjoining states. We produced a set of tables for known map units by MLRA’s. These were used for planning and soil manuscripts for several years. I was party leader in Osage County, Oklahoma, in about 1962, when Arnold Heerwagen, Great Plains Range Conservationist, visited the county with a number of soil scientists and range conservationists from the State Office. He brought a new concept. There would be complexes of range sites to match the soil complexes. In the past an average condition had been used when more than one soil was in a map unit. We were one step closer to interpreting the taxonomic unit instead of the map unit.

Changes Resulting From Using Soil Taxonomy

We began serious use of Soil Taxonomy after receiving the June 1964 supplement to the 7th Approximation. We learned that we were classifying a concept. We were mapping a landscape and using a classification category, such as a series, in naming the map unit. The map unit was a real piece of landscape with inclusions of other soils. During this time we also had a number of statistical studies to determine map unit composition.

Rapid Changes in Soil Interpretations

In 1967, the green book “Guide for Interpreting Engineering Uses of Soils” was issued and used as a source of interim instructions until the “brown book,” or the official version, was issued in 1972. Tables were increasingly used. Interpretations for engineering uses, such as building site development and sanitary facilities, were included, and slight, moderate, and severe limitations became part of our vocabulary. Soils were rated as good, fair, or poor sources of construction material. In 1967, Dr. Lindo J. Bartelli talked the State Soil Scientists and State Soil Survey Leaders in the South National Technical Center Area into coordinating soil interpretations by the name of soil series on a form. This method had been used successfully in a number of states. The guides for this form were developed mostly at the Southern Regional Work Planning Conference. The form to be filled out in pencil and coordinated among states was dated December 1968. The West NTC States also began working on a set of guides. This information worked well for a few years until Keith Young and others turned the regional efforts into a national computerized form known as the Soil Interpretation Record but more commonly called the Soils 5 Form. This resource allowed us to have a coordinated data base of known soils for rapid use.

There were of course other advances in woodland, nonagricultural interpretations, and, very important for conservation, the Universal Soil Loss Equation (USLE). The plant scientists also were making rapid strides in

of the fellows were following that guide like they did their Bible. The meaning of this was humorous but not entirely clear as Bart was from Michigan and most of these fellows were Southern Baptists.

Major Test for Interpretations

We received a wake-up call when the 1985 Farm Bill began to be enacted. Highly erodible land, a new interpretation, was an either-or interpretation—no ifs , ands, or maybe. A farmer could lose financial benefits as a result of this "go or no-go" system. We soon realized that the hydric soil concept from the Swampbuster part of the 1985 Farm Bill was also a "go or no-go" decision. At the interagency training for users of the new Federal Manual, I realized that the biologists had leeway with a plant index of 2.5 to 3.5. The engineers had some leeway with the concept of a normal year. The hydric soil decision, though, was a "yes or no" and usually the controlling factor. I questioned the developers as to how they got by with that concept. The manual also made reference to a biologist and a *competent soil scientist*. The leaders laughed as though I was joking when I questioned their ideas. The next shock came when the Government Accounting Office checked compliance with the 1985 Farm Bill and assigned responsibility for technical errors to the National Technical Center Directors instead of the State Conservationists. The Chief had written a letter, I understood, telling the State Conservationists that they were in charge, but the official documents still said that the NTC Directors were responsible for technical accuracy. I think this issue caused a lot of problems in the next few years.

Not everything worked according to plans. The next step in interpretations was to be Soil Potentials, in which we weighted the factors affecting the problem. This system was not accepted as well as we had hoped. We were quite good at interpreting by phases of soil series for detailed soil maps. We were not so good at interpreting the higher categories of classification or the higher Orders of soil survey. I proposed putting Order Three interpretations in separate tables from Order Two interpretations but was voted down on that proposal. I should be up to a point where many current soil scientists have seen the developments in interpretations. There is a great opportunity for improvement. Good luck. ■

KANSAS

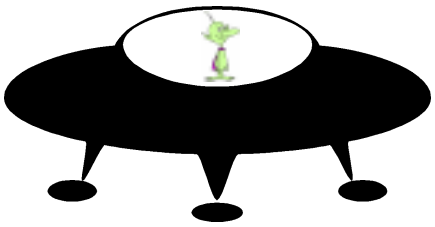
The Pith Helmet

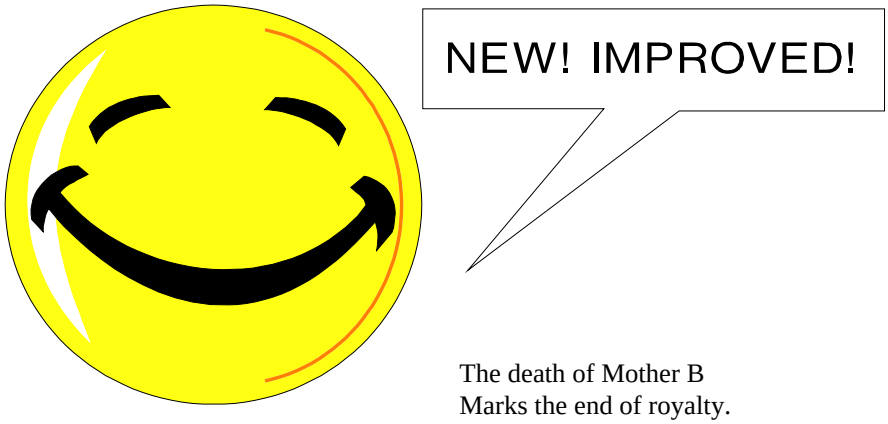
By Rodney Harner, Soil Scientist (retired), United States Department of Agriculture, Natural Resources Conservation Service.

One hot, windy summer day, I was riding in the back of a government sedan with Ed Templin as we conducted a soil survey progress review. "We" included Art Nelson, State Soil Scientist of Kansas; Henry Otsuki, Soil Survey Supervisor for southwest Kansas; and several others following along in a second car. At the time Ed was Soil Correlator for Oklahoma and Kansas. He could be exasperating at times, but his vast knowledge of soils was never doubted.

This was before the days of air-conditioning in government cars, so naturally we had all the car windows rolled down in order to survive the heat. Ed was wearing a pith helmet, the kind that explorers are usually pictured in. Can you imagine anything more impractical in southwest Kansas? Every gust of wind that came through the car windows sent that hat sailing to the car floor or seat or even into the lap of the driver, much to his surprise.

As we were driving along between two wheat stubble fields, that hat blew off for the umpteenth time. Ed reached down, grabbed the pith helmet, and sailed it out the open car window and across the stubble with the exclamation, "That's the last time that d____ hat blows off." That hat made a perfect Frisbee and sailed out across that field in a beautiful spiral. I have often wondered what the farmer thought when he came across that pith helmet lying there in his wheat stubble, thousands of miles from where one was expected. Were the bones of a lost explorer nearby? Did some little green men from outer space land here and wonder what kind of a place this was, with nothing but wheat stubble as far as the eye could see and the horizon barely visible through the shimmering heat waves and whirling dust devils? ■





A Lament for B

Now it seems to me
That busy as a B
Finds its manifestation
In the Fifth Approximation.

Is it B or not to be
Betwixt the A and C?
Or has it lost its old position
For new-found erudition?

Once I knew one B,
As simple as could be;
She wooed me with her true location,
Not clay-skin deep solicitation.

A big and strong old B
A B two B could be.
When flashy charms defied notation
I glorified the soil description.

Was she a Mother B,
Full of many a little B?
For with today's atomic fission
The fate of B is long division.

A dozen B's for B
Won't stay in A to C.
With a B for each attraction
They'll compete for habitation.

Without old Mother B
Who'll say what is a B?
Who'll see they have protection
From geological distraction?

The death of Mother B
Marks the end of royalty.
How can we maintain distinction
Midst so much discrimination?

B's loss of royalty
Means not democracy
For plain men will give distinction
To the obvious field condition.

Thus how give nobility
And keep reality
With all the B's in true relation
And not one lost from indecision?

Can we take the lab to see
All soil morphology?
Or do we add to field condition
Genetic truth from revelation?

Let's call the roll to see
What subtle galaxy
B's new algebra of relation
Displays in Fifth Approximation:

('Twill be easier for me
To list the kinds of B
Without continual alteration
In the metric composition.)

The old podzolic texture B
Has clay-skins now to make it be,
And if there are no skins to see
It still may be a clayey B;
Or better still, try hard to see.
We now abhor transitional B:
Can it be that it is no B?
I'll leave it in my list to see
If structural B and color B
And latosolic B will be
Enough to keep horizon C
Down where I think it ought to be.
Next we come to a flirty B
With a red-brown dress that I can see.
But is it humus that I see?
Or is it iron and is it free?
Or alumina, or all three?
And not mixed with a clayey B?
Well fares the solonetzic B
If caps are clear for all to see;
But not so clear the gleyic B,
And still less so the limy B
Unless it's well above the C.
Now what will become of old B three?
An evil rumor came to me
That it could even cease to be,
Portioned out to a new C-B
And to an elevated C
That's being pushed up by a D
The *Manual* says should never be.
This evil thing to poor B three
Emerges from geology.
Weathering now belongs to C,
Soil formation to A and B;
But if we fail to keep them free
Only regolith will still be
And that can hardly have a B.
If strong men scorn such heresy
We'll always have an A, B, C.

We all have seen a buried B;
That is not rock, because it's B,
Even though we call it C
To soil above that has a B.
Anthropic A can be Ap,
But so may too anthropic B.
On B two m none yet agree
Since fragipan has gotten free.
Then too we had a u on B
To show an unconformity;
But now the purists say to me:
"You mean, discontinuity."
Out list has outgrown brevity
So I'll but mention fractured B,
Broken by the *Manual* D
Or cut in two or even three
By tongues of A two shaped like V.
Of course, we have eroded B
And "topsoil" made of it and C.

But let us keep old subsoil free
And add more lines for each new B.
(See page one hundred eighty-three
On how to subdivide a B.)

I failed to list I see
The most important B,
Because the *Manual* has notation
Where we lack an explanation.

It provides for one, two, three;
So now we need another B.
We'll need a B for hesitation—
A B horizon of frustration.

One sigh for Mother B
And in her name a plea:
Don't lose her major connotation
By unneeded mutilation.

Charles E. Kellogg

Since modern soil science arose about 1870 it has been in a nearly constant state of vigorous flux. One particularly active area has been, and is, that of soil classification. In 1951 the American Soil Survey started to construct a new soil taxonomic system. The papers engendered by this effort now fill many file drawers. A lot, some would say the majority, of these papers make dry reading. The sparks of a few, though, shed extra light on the problems with which soil scientists struggled during these sixteen years. One such document is "A Lament for B." It is being published now to assure it a lasting place in the record of the Soil Classification Exercise, 1951-1967.

Portland, Oregon,
October, 1967

An "Author's Preface," presumably addressed to Guy Smith, reads as follows:

Dear Guy:
On the train from Monticello, I reflected on more talk about horizon nomenclature. It will definitely NOT be helpful.

CEK

January 22, 1957

Analysis and Explanation

By Stanley Anderson, Editor, United States Department of Agriculture, Natural Resources Conservation Service, National Soil Survey Center.

The poem "A Lament for B" was privately printed in the year 1968, or MCMLXVIII (as the title page reads), by William M. Johnson at his Twelve Oaks Press. An "Editor's Preface," written by William Johnson, reads as follows:

The meaning of the poem centers on what Dr. Kellogg calls the "death of Mother B." Apparently, the concept of the B horizon changed from one of position in the profile (lines 5-7) to one of "new-found erudition" (line 8). This erudition involves the various morphological processes that result in